

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : **10-004226**

(43)Date of publication of application : **06.01.1998**

(51)Int.Cl.

H01L 43/08

G11B 5/39

H01F 10/08

(21)Application number : **08-175490**

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(22)Date of filing : **14.06.1996**

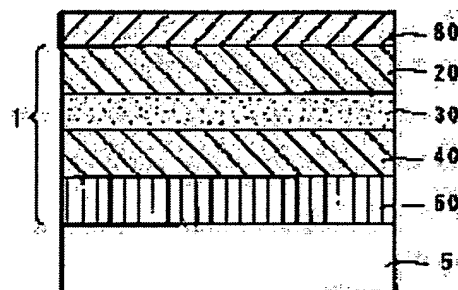
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## (54) MAGNETIC MULTILAYER FILM, MAGNETIC RESISTANCE EFFECT ELEMENT AND MAGNETIC CONVERSION ELEMENT

(57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a magnetic multilayer film showing a large MR change rate, showing the rising characteristics of linear MR change of applied magnetic field in a very small range of -10 to 10 Oe or thereabout, for example, and also having high sensitivity of magnetic field and large MR(magneto-resistance) tilt in a high frequency magnetic field.

**SOLUTION:** An oxide anti-ferromagnetic layer 50, a pinning ferromagnetic layer 40 which is pinned by the oxide anti-ferromagnetic layer 50, a non-magnetic metal layer 30, and a free ferromagnetic layer 20 are laminated successively on a substrate 5 in this multilayer film 1. In the case, the surface roughness on the pin-stopping ferromagnetic layer side of the oxide anti-ferromagnetic layer is 0.6nm or smaller, and the crystal grain diameter D of the oxide anti-ferromagnetic layer 50 is 10 to 40nm.



## LEGAL STATUS

[Date of request for examination]

17.07.1998

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3137580  
[Date of registration] 08.12.2000  
[Number of appeal against examiner's decision of rejection]  
[Date of requesting appeal against examiner's decision of rejection]  
[Date of extinction of right]

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